seum proper should be in charge of assistants whose duties are so arranged as to leave a good part of their time free for original research; the museum as a whole forming an important branch of the natural-history department of the university, with which its assistants and professors are intimately connected.

An enumeration of the contents and uses to which the space is devoted will give a better idea of the aims of the museum than a lengthy description.

Exhibition-rooms.

Synoptic room: synopsis of the animal kingdom, living and fossil.

Five systematic rooms for the systematic collections of mammalia, birds, fishes, mollusca, radiates, and protozoa; and their galleries for reptiles, insects, and crustacea.

Seven faunal rooms and galleries: North American, South American, African (including Madagascar), Indian, Australian, Europeo-Siberian,[1] Atlantic,[1] Pacific.[1]

Four rooms for the paleontological collections.

Two rooms for the paleozoic, one for the mesozoic, and one for the tertiary, as follows: Silurian and Devonian,[1] carboniferous and Jura,[1] cretaceous,[1] tertiary.[1]

The work-rooms for the assistants of the museum, and the storage-rooms, which are also intended as work-rooms of their special subjects, are distributed as follows, in addition to a large receiving-room and a general workshop: —

The alcoholic collections stored in the basement occupy four rooms devoted to fishes, two rooms for fishes and reptiles, one room for birds and mammals, one room for mollusca, one room for crustacea, one room for the other invertebrates.

The entomological department is to occupy eventually four gallery-rooms of the first story.

The work rooms and storage-rooms of the fifth story are filled by collections occupying five rooms devoted to birds and mammals, three for skins and eggs and two for skeletons, one for crustacea, one for mollusca, one for fish and reptile skeletons, one for the collection of dry invertebrates (corals, echinoderms, sponges, etc.), two for fossil vertebrates (exclusive of fishes).

[1] Not yet open to the public.

The remaining paleontological collections are crowded into four work and storage rooms. There are two work-rooms for the geological and lithological department. Four rooms are devoted to the library of the museum, and one room for the office of the curator. There are also a large general lecture-room, three laboratories for students in biology, three laboratories for students in geology and paleontology, with two smaller private rooms for the instructors. With the biological laboratories will be connected also a large room for an aquarium for both fresh-water and marine animals, and another room for a vivarium, both of which are in the basement of the building.

This will give, in all, seventeen rooms devoted to the exhibition of collections for the public; ten work and storage rooms in the basement, for the alcoholic collections; thirteen work and storage rooms for the dry zoölogical collections; eight similar rooms for the paleontological and geological collections; and thirteen rooms devoted to the laboratories, lecture-rooms, and library connected with the instruction given at the museum; the arrangement being such, that, whenever any departments (as, for instance, the geological and geographical, or the anatomical, or any other) outgrow their present quarters, room can be made for them by extensions of the building, for a long time to come, without interfering with the plans which have been carried out thus far.

In adopting a small unit for the size of the rooms (30×40 feet), all attempts at exhibition-rooms, imposing from their size, were deliberately abandoned. It is aimed only to place before the public such portions of the collections as shall become instructive; and in the storage and work rooms the appliances for storage aim at economy of space, and are intended, while they do not neglect the careful preservation of the collections, to give to the assistants and students the freest and quickest possible access to them.

RECENT PROCEEDINGS OF SCIENTIFIC SOCIETIES.

Cambridge entomological club.

Feb. 8. — Mr. G. Dimmock called attention to some curious habits of the common European earwig, Forficula auricularia, a specimen of which he had kept in confinement several months. These insects are omnivorous, but apparently prefer insects as food, eating their own species greedily. Although to all appearances blind, except to the presence or absence of light, the specimen above mentioned captured fleas (Pulex irritans) with ease in an enclosure about five centimetres in diameter. No notice was taken of a flea put in the enclosure until the flea actually touched the earwig, when the latter would rush after the flea, palpitating with the antennae rapidly, and thus keeping on his track. If the flea escaped from beneath the antennae of the earwig, the latter would find him again in a moment, and the amusing chase would be renewed, to end in the sure seizure of the flea in the mouth-parts of the earwig. The earwig was a glutton, and would often eat a large number of fleas or other insects in succession, at the end of his repast his abdomen being much distended. —— Mr. S. H. Scudder exhibited a specimen and drawings of an arachnid from the coal-measures of Arkansas. Two years ago Karsch figured a similar form from the coal of Prussian Silesia, under the generic name Anthracomartus, and Kušta has just described another from carbo-

niferous beds in Bohemia. This adds another to the many instances in which a new generic type of carboniferous arthropods had no sooner been announced as found on one continent than it was discovered on the other. The Arkansas species was obtained by Prof. F. S. Harvey of Fayetteville, and had not been in Mr. Scudder's hands a month before a second American species was found by Mr. R. D. Lacoe in the well-known beds of Mazon Creek, Ill.

Biological society of Washington.

Feb. 8. — Mr. W. T. Hornaday read a paper on the guacharo bird of Trinidad, describing the habits of the Steatomis caripensis as observed by him in one of the caves where it breeds. —— Mr. G. Brown Goode read a paper on the aims and limitations of modern fish-culture. Modern fish-culture he defined to be fish-culture carried on upon an immense scale, under the direction of men trained to scientific research, as distinguished from the old and insignificant method of fish-culture carried on by private enterprise. Its aims were shown to be, 1, to arrive at a complete understanding of the life-histories of useful aquatic animals, and the conditions under which they live; and, 2, to apply this knowledge so thoroughly that all fishes shall be brought as completely under control as are now the shad, the salmon, the carp, and the whitefish. The limitations of fish-culture were shown to be the same as those of scientific stock-rearing or agriculture. —— Dr. T. H. Bean made a communication upon an augmented development in the fins of a species of Siphostoma, exhibiting a specimen with a supernumerary anal fin. In the discussion of this paper, Mr. John A. Ryder remarked that this deformity was an attempt toward reversion to the condition of some remote ancestral type in which there was a continuous fin around the posterior portion of the body. —— Mr. C. D. Walcott exhibited a specimen of trilobite, Asaphus sp., in which twenty-six pairs of legs, and the mouth-parts also, were plainly to be seen; also a specimen of Maine granite containing fossil corals, probably of the Devonian age.

Philosophical society of Washington.

Jan. 19. — Mr. Israel C. Russell made a communication on the existing glaciers of the high Sierra in California. After showing the extent of the ancient glaciers of the region, and their relation to the topography, he described in detail the phenomena of the Mount Dana, Mount Lyell, and Parker Creek glaciers, closing his remarks with a reference to the literature of the subject. The Mount Dana glacier lies at the foot of a cliff on the north face of that peak, with an elevation of 11,500 feet above the sea. It is at the head of a deep cañon draining into Lee-Vining Creek, one of the tributaries of Mono Lake. It is approximately 2,500 feet long, and of somewhat greater breadth. Notwithstanding its small size, the distinction between the snow-ice of the *névé* and the solid greenish-blue ice of the glacier proper is clearly marked. Its planes of growth are indicated by a banded structure, — compact ice alternating with thin sheets of porous white ice and with dirt-bands. It is abundantly provided with crevasses, and has a terminal moraine visibly growing. The stones of the moraine show marks of attrition, and the lakelet fed by the outflowing stream is milky from suspended detritus. The Mount Lyell glacier is somewhat larger, and exhibits substantially the same characters. A portion of its surface is characterized by 'ice-pyramids.' These occur only near the foot of the glacier, where the surface is rapidly melting, and depend upon the power of superficial pebbles to rescue the ice immediately beneath them from the porosity elsewhere produced by insolation. The Parker Creek glacier, likewise at the head of a tributary of Mono Lake, resembles the others in its general features, and displays in addition a considerable number of 'glacier-tables,' — blocks of rock perched on standards of ice. A number of other glaciers were seen at a distance of a few miles, but were not visited. The various phenomena were illustrated by photographs.

Mr. Gilbert Thompson described certain glaciers on Mount Shasta believed to be new to science. Their discovery increases the number of known glaciers on the flanks of Shasta to seven. Mr. W. H. Holmes described the glaciers of the Wind River Mountains, and the glaciers of Mount Moran in the Teton Range. The former are from one-fourth of a mile to one mile in length. The latter are three in number, and lie at an altitude of 12,000 feet. Mr. Mark Kerr mentioned the occurrence of a glacier in the Salmon Mountains, a division of the Coast Range.

Prof. W. C. Kerr described the mica-mines of North Carolina, explaining their geological relations, and setting forth the economic and mineralogic results of their exploitation. He described more particularly a series of prehistoric excavations, which are large and numerous, and were evidently made for the purpose of obtaining the same mineral. One of these measures 150 by 75 feet, and, despite a partial filling with *débris*, retains a depth of 35 feet. The ancient work was performed with blunt-pointed tools, doubtless of stone; and facts connected with the arboreal vegetation show that it had been discontinued as much as five hundred years ago.

Scientific club, Manhattan, Kan.

Jan. 18. — Mr. Shartel presented some notes regarding the Suez and Panama canals and the Augsburg tunnel. Mr. Marlatt described a worm which he observed last year. Professor Kellerman made some interesting remarks respecting the occurrence of chlorophyll in animals. Superintendent Graham gave a description of some carvings on a rock in a cave in Greenwood county. These carvings were observed by Mr. Mason, and drawings which he made of them were exhibited. Mrs. Kellerman gave an interesting description of the Termites, or 'white ants.' She described their manners and customs, grades of society, architecture, political economy, and many other points. Mr. Lund read a paper on the undulations of the earth's surface. He cited numerous instances of elevations and depressions that are

taking place at the present time, as well as some of the more remarkable ones of past ages.

Cuvier club, Cincinnati.

Jan. 5. — In their annual report, the trustees stated that the club expended during the year $238.60 in the prosecution of the game-laws. The extension of the open season for quail through November was suggested as not likely to do injury; and attention was called to the continued pollution of waters, and the consequent destruction of fish. The necessity was urged of protecting the National park from the speculator, and such tracts as the Adirondacks from the wood-chopper.

Academy of natural sciences of Philadelphia.

Dec. 11, 1883. — In an account of the formicaries of the carpenter ant, the Rev. H. C. McCook related observations proving that the females of Camponotus pennsylvanicus, when fertilized, go solitary, and, after dispossessing themselves of their wings, begin the work of founding a new family. This work they carry on until enough workers are reared to attend to the active duties of the formicary; as, tending and feeding the young, enlarging the domicile, etc. After that, the queens generally limit their duty to the laying of eggs, and are continually guarded and restricted in their movements by a circle of attendant workers, or 'court.' The facts are further illustrated and enlarged by a series of observations made by Mr. Edward Potts, in accordance with the speaker's suggestions and directions. They establish or confirm the following points: 1. The manner of depositing the eggs, which, as well as the larvae, are cared for by the queen until workers are matured; 2. The stages in the development of the egg and larvae are partially noted; 3. The time required for the change from larval to pupal state is about thirty days; 4. About the same period is spent in the pupal state, the entire period of transformation being about sixty days; 5. The work of rearing the first broods begins the latter part of June, or early in July; 6. About twenty-four hours are spent by larvae in spinning the cocoon; 7. The ant-queen probably assists the callow antling to emerge from its case; 8. Not only the larvae, but occasionally the antlings, are fed by the queen; 9. The young workers, shortly after emerging, begin the duty of nurses, caring for the eggs, and tending the larvae.

Jan. 1. — Professor Joseph Leidy exhibited specimens of tin ore from the Black Hills, Dakota. They consisted of a mass of granite containing cassiterite, a fragment of quartz with the same, and a mass of pure cassiterite of about one-pound weight. He had also seen several pounds of large grains obtained from gold-washings. From among these he had picked out several characteristic crystals.

NOTES AND NEWS.

THE death, last Friday, of Professor Arnold Guyot of Princeton, removes one more of those distinguished men of broad scientific culture, who, nurtured in Europe, have given the best fruits of their lives to America. His influence on the young men under his teaching was second only to that of his devoted friend and countryman, Agassiz. We shall speak more at length of his life and characteristics in a future number.

— It will be a source of pleasure to those who are aware of the reliable and conscientious character of Dr. Joseph Leidy's contributions to science, to learn that he has been awarded by the Geological society of London the 'Lyell medal,' with its accompanying purse of twenty-five pounds, in recognition of his important services to paleontology. In a letter received from Warington W. Smith, foreign secretary of the Geological society, dated Jan. 25, Dr. Leidy is advised of the award, and requested to depute some fellow of the society to receive the same at the anniversary meeting to be held on the 15th inst., for transmission to Philadelphia.

— The fourth volume of the census reports has been issued from the press. This is upon the 'agencies of transportation,' and includes the statistics of railroads, steam-navigation, canals, telegraphs, and telephones. Naturally the first of these subjects takes up the bulk of the volume, monopolizing 651 pages out of a total of 869. The statistics and discussion of this subject, as well as of telegraphs and telephones, have been prepared by Mr. A. E. Shuman, whose thorough acquaintance with the subjects, and whose painstaking care, are amply illustrated by the reports in question.

The total railroad mileage in operation on June 1, 1880, is given as 87,781 $\frac{97}{100}$. This was under the management of 631 corporations. The total cost of construction was $4,112,367,176, and of equipment, $418,045,458. The assets of the whole system amounted to $5,536,419,788, and the liabilities, $5,425,722,560. The paid-in capital stock aggregated $2,613,606,264, over 80 % of which earned a profit at an average rate of $6\frac{32}{100}$ %. The total number of stockholders (estimated, in part) was not far from 300,000, giving an average of $8,700 of stock to each. The aggregate freight mileage was 32,348,846,693, and the passenger mileage, 5,740,112,502. To illustrate the amount of railroad travel, it may be said that this represents an average travel of 114 miles for each man, woman, and child in the country. The above figures, when contrasted with those representing the condition of the railroad interest in this country at the close of 1882, show an immense growth during the two years and a half. At the latter date there were in operation not fewer than 117,717 miles, an increase of 29,835 miles, while the capital had increased in approximately the same proportion. At that date the total railroad mileage of the globe is given (Spofford's Almanac) as 264,826, of which this country owned over 44 %. The total of all Europe was less than that of the United States, being but 105,895. The statistical tables of the report upon railroads contain, 1°, a general financial exhibit of the several roads; 2°, a general balance-sheet; 3°, traffic operations; 4°, passenger and freight mileage; and,